

*When HF/E practitioners, researchers, and parents collaborate to make a safer cycling environment, children as well as the environment benefit.*

### HF/E Professionals: Help Make Biking to School Safer

BY THOMAS J. AYRES

**W**HEN SCHOOL OPENS again this fall, which transport mode will you choose for your children's school commute? Will they be traveling under their own power, or will they be riding in a car or a bus?

If your children are driven to school every day, they are among the vast majority of school-age children. Over the years, the number of children who use active school transportation – walking or biking – has declined significantly. Forty years ago, more than 40% of school-age children in the United States used active transportation. By 2001, active transportation accounted for less than 13% of travel trips to school (McDonald, 2007) and less than 1% of travel miles to school (National Research Council, 2002).

In this article I outline how, as a human factors (HF/E) professional or as a parent, you can make a difference in your community by supporting a return to safe active school transportation. The associated risks have been identified through research, and the effectiveness of various safety interventions has been assessed, providing many opportunities to contribute toward a safer cycling environment in which more children may enjoy the benefits of active school transportation. This article focuses on bicycling, but much of the discussion applies to walking as well.

#### Why Active School Transportation?

There are many reasons to encourage children to cycle to school. It's fun, it builds positive life-long habits, and the exercise promotes good health and counters weight gain. When children cycle together, they find opportunities for social interactions. In addition, cycling gives children increased independence and helps them learn about traffic operation before they're old enough to drive a motor vehicle.

Active transportation also helps the environment through reduced motor vehicle traffic, improved road conditions, and a decrease in pollution. In turn, lower fuel consumption saves money and slows the accumulation of greenhouse gases.

Furthermore, encouraging more people to ride bicycles can help make a safer cycling environment, because cycling safety increases on a per-person basis as more people ride bicycles (Jacobsen, 2003).

What stands in the way of active school transportation? Some of the change in transportation mode preferences can be attributed to the distance traveled to school, which has increased over the years (McDonald, 2008). Some claim that active travel is impractical because many children live too far from school (e.g., Falb et al., 2007), and it has been suggested that efforts to increase active transportation are largely doomed by the long distances that children travel to school (McDonald, 2007).

But a distance of one or even two miles is not a reasonable limit for an active school commute, especially with a bicycle. It is likely that parental attitude also has played a role in holding back active school transportation; perhaps distance is more problematic for parents than it is for children. Surveys indicate that the most common reasons given by parents for not helping their children use active transportation involve the time commitment and the perceived risks (e.g., Eyler et al., 2008).

#### Addressing the Risks

Suppose you live within a few miles of school, close enough for your child to commute on a bicycle, but you are worried about her or his safety. If you don't have time to accompany your child to and from school on a regular basis, how can you feel comfortable sending her out on her own? Isn't it risky for children to travel

actively to school, facing traffic and unkind strangers? Indeed, it is estimated that the per-trip risk of bicycling to school is higher than that of most other transport modes, second only to traveling as a passenger in a vehicle driven by a teenager (National Research Council, 2002).

Fortunately, there are effective approaches to reducing these risks. As a first step, it is important to understand the nature of the risks. By analyzing injury and crash data, researchers have established that most cycling injuries are related to – and therefore potentially preventable by – aspects of rider behavior (e.g., Ayres et al., 1998; Rodgers, 1993). Even in the minority of incidents that involved collisions with motor vehicles, there were frequent opportunities for the cyclists to reduce the likelihood of such collisions through their behavior.

Most adults lack an understanding of how to bike safely when sharing the roads with motor vehicles, and children are at an even greater disadvantage because they have limited experience and knowledge about traffic laws. Bike safety classes have proven to be effective in increasing relevant safety knowledge among both adults and children.

School-based programs often provide free helmets and generally emphasize the proper use of helmets as well as basic rules for riding safely. In before-and-after observations near schools that provide bike safety education to students, there is evidence of improved safety behavior (Pedroso, 2009) as well as reduced injuries (Ayres, 2005). For example, cycling safety instructors taught sessions on helmet use and bicycle safety to all seventh-grade students in four middle schools and found that the percentage of students seen wearing their helmets rose from 42% before the sessions to 67% a year later (Ayres, 2006).

Given the proven effectiveness of properly worn helmets in mitigating head injuries in bicycle crashes, such observable behavioral changes indicate that a substantial safety benefit can be gained from educational efforts. HF/E practitioners can help to ensure that bicycle safety education programs are designed to change behavior, not just impart knowledge, through the use of modeling, reinforcement, and other means. Information about bike safety classes for adults and children can be found through the American League of Bicyclists ([www.bikeleague.org](http://www.bikeleague.org)).

### Safety in Numbers

If you would like your child to have adult supervision on the way to and from school but you don't have the time to do so on a regular basis, consider joining a group that shares the responsibility. Safe Routes to School programs ([www.saferoutesinfo.org](http://www.saferoutesinfo.org)) often include "walking school buses," which are akin to carpooling, so that parents can share the task of walking with a group of children. A similar approach – bikepooling – is sometimes used for groups of children biking to school. As bikepool leaders, parents can learn about safe riding through bike safety classes and in turn provide safe riding direction to children through explanation, modeling, and enforcement.

### Toward a Safer Cycling Environment

For the most part, our cities and towns were developed for primary transportation by motor vehicles. For that reason, the routes available for active school transportation often are forbidding for children, especially if they are on bikes. Children may confront arterial streets with high-speed traffic and no bike lanes, or they may have to cross freeway on-ramps and off-ramps where cars do not stop or need to navigate complex intersections. Even the sidewalks are not safe for cyclists, in part because every driveway is a potential intersection in which motor vehicles can come into conflict with cyclists (Wachtel & Lewiston, 1994).

Segregated facilities (for example, paved bike paths, parallel to roadways, that are carefully planned to safely accommodate roadway and driveway crossings) are especially important for young cyclists, who cannot rely on experience gained from

operating a motor vehicle to understand the rules of the road and the ways in which drivers are likely to act. For example, the increased use of roundabouts or traffic circles creates challenges for drivers as they enter and negotiate traffic streams. This in turn creates challenges for cyclists if they do not anticipate the difficulty of being seen and avoided by the drivers (Young et al., 2000).

There is no single solution to these problems; rather, a variety of changes must be considered on a case-by-case basis. Bicycle and pedestrian safety can be improved by adding bicycle lanes to streets, creating bike paths for avoiding busy streets, implementing measures for calming traffic and reducing speed, marking crosswalks, building overhead crossings, and generally reducing the likelihood of conflicts. Problems must be identified locally so that parents can play an important role by looking at potential trouble spots in the routes that their children will take when they cycle to school.

HF/E practitioners can help by reviewing reports of local crashes or collisions (in the form of police reports, or as data collected by local bicycle coalitions) for evidence of problematic streets or intersections, and by conducting questionnaires or observational surveys of cycling patterns to determine behaviors to target for change. Researchers and practitioners can also help by providing technical and evidentiary support for efforts to obtain funding for infrastructure changes, such as pedestrian overpasses and bridges, which require years of advocacy and planning before approval and implementation.

Programs such as the Safe Routes to School program provide funding and other resources for those who wish to promote bicycle and pedestrian safety programs. The majority of funding for the federal Safe Routes to School program is designated for infrastructure improvements, along with education and other elements. Contact the National Center for Safe Routes to School ([www.saferoutesinfo.org](http://www.saferoutesinfo.org)) and the Safe Routes to School National Partnership ([www.saferoutespartnership.org](http://www.saferoutespartnership.org)) to learn about state and local funding, local Safe Routes to School efforts, and how you can get involved.

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